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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,789	04/25/2005	Philippe Chanclou	09320.0185USWO	7694
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MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			CHU, CHRIS H	
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DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/509,789	Applicant(s) CHANCLOU, PHILIPPE	
	Examiner Chris H. Chu	Art Unit 2874	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-6 is/are allowed.
- 6) ☒ Claim(s) 1, 7-15, 18-23, 26 and 27 is/are rejected.
- 7) ☒ Claim(s) 2, 16, 17, 24 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/05</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The prior art documents submitted by applicant in the Informational Disclosure Statement filed on January 3, 2005 have all been considered and made of record (note the attached copy of form PTO-1449).

### ***Drawings***

Two (2) sheets for formal drawings were filed September 30, 2004 and have been accepted by the Examiner.

### ***Specification***

Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 7-9, 14, 15, 18, 23, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Thual et al. (6,014,483).**

Regarding claims 1 and 7, Thual et al. discloses a production method of at least one expanded core monomode optical fiber, wherein it comprises the steps of assembly of at least one graded index multimode fiber with at least one mode expansion monomode fiber, such that said graded index multimode fiber retains the diameter of the optical beam propagated therein in Figs. 2F-2J and Fig. 4; splitting of said graded index multimode fiber to form a protective component of predetermined length of said mode expansion monomode fiber in column 4, line 29 and Figs. 2I and 2J; and wherein it uses ribbons of  $n$  fibers to produce a set of  $n$  expanded core fibers collectively in Fig. 2J.

Regarding claims 8 and 9, Thual et al. discloses a production method of an expanded core fiber comprising a geometric modeling step wherein the end of the graded index fiber is cleaved straight in Figs. 2I and 2J.

Regarding claim 14, Thual et al. discloses an optical monomode fiber collimator wherein it comprises at least one segment of mode expansion fiber, and at least one segment of expansion holding fiber comprising at least a first segment of graded index multimode fiber in Fig. 2J and Fig. 4.

Regarding claim 15, Thual et al. discloses an optical monomode fiber collimator wherein said segments of mode expansion and expansion holding fiber have the same diameter as said monomode fiber in Fig. 4.

Regarding claim 18, Thual et al. discloses an optical collimator wherein the end of the graded index fiber is cleaved straight in Figs. 2I and 2J.

Regarding claim 23, Thual et al. discloses an expanded mode diameter monomode optical fiber, wherein it comprises at its end at least one mode expansion section and at least one expansion holding section comprising at least a first segment of graded index multimode fiber forming a protective component of predetermined length of said mode expansion section, said expansion holding section retaining the diameter of the optical beam propagated therein in Fig. 4.

Regarding claim 26, Thual et al. discloses a monomode optical fiber wherein said monomode fiber, said mode expansion section, and said expansion holding section have the same diameter in Fig. 4.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 10 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thual et al. (6,014,483) in view of Zhang et al. (6,167,174).**

Regarding claim 10, Thual et al. teaches a production method of an expanded core fiber comprising a geometric modeling step wherein the end of the fiber is cleaved straight, but does not specifically state the geometric modeling step to consist of cleaving or polishing at an angle. Zhang et al. teaches fibers that are polished at an angle in column 6, lines 57-60. Since both inventions relate to end operations of optical

fibers, it would have been obvious to one of ordinary skill in the art at the time the invention was made to polish the fibers at an angle as disclosed by Zhang et al. in the production method disclosed by Thual et al. for the purpose of reducing return reflections.

Regarding claim 19, Thual et al. teaches an optical collimator wherein the end of the fiber is cleaved straight, but does not specifically state the end to be cleaved or polished at an angle. Zhang et al. teaches fibers that are polished at an angle in column 6, lines 57-60. Since both inventions relate to end operations of optical fibers, it would have been obvious to one of ordinary skill in the art at the time the invention was made to polish the fibers at an angle as disclosed by Zhang et al. in the optical collimator as disclosed by Thual et al. for the purpose of reducing return reflections.

**Claims 11-13 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thual et al. (6,014,483) in view of Okubo et al. (5,565,978).**

Regarding claims 11-13, Thual et al. teaches a production method of an expanded core fiber comprising a geometric modeling step wherein the end of the fiber is cleaved straight, but does not specifically state the geometric modeling step used to round said end by melting, drawing, or material addition, or etching by chemical, mechanical, or laser means. Okubo et al. teaches fibers that are rounded to form a lens by melting in column 8, lines 15-18. Okubo et al. also teaches the end of the fiber to be etched in column 8, lines 15-18. It would have been obvious to one having ordinary skill in the art to etch by chemical, mechanical, or laser means, since all three are well known methods of etching in the art. Since both inventions relate to end operations of optical

fibers, it would have been obvious to one of ordinary skill in the art at the time the invention was made to round the end of the fiber into a lens as disclosed by Okubo et al. in the production method disclosed by Thual et al. for the purpose of altering the expansion angle of the light emitted from the fiber.

Regarding claims 20-22, Thual et al. teaches an optical collimator wherein the end of the fiber is cleaved straight, but does not specifically state the end to be rounded by melting, drawing, or material addition, or etching by chemical, mechanical, or laser means. Okubo et al. teaches fibers that are rounded to form a lens by melting in column 8, lines 15-18. Okubo et al. also teaches the end of the fiber to be etched in column 8, lines 15-18. It would have been obvious to one having ordinary skill in the art to etch by chemical, mechanical, or laser means, since all three are well known methods of etching in the art. Since both inventions relate to end operations of optical fibers, it would have been obvious to one of ordinary skill in the art at the time the invention was made to round the end of the fiber into a lens as disclosed by Okubo et al. in the optical collimator disclosed by Thual et al. for the purpose of altering the expansion angle of the light emitted from the fiber.

**Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thual et al. (6,014,483) in view of Yamauchi et al. (5,689,578).**

Regarding claim 27, Thual et al. teaches an expanded mode optical fiber, but does not specifically state the fiber to be of a polarization holding type. Yamauchi et al. teaches a fiber that is of a polarization holding type in the abstract. Since both inventions relate to optical fiber devices, it would have been obvious to one of ordinary

skill in the art at the time the invention was made to use a polarization holding fiber as disclosed by Yamauchi et al. in the expanded mode fiber as disclosed by Thual et al. for the purpose of preserving the polarization of the light.

***Allowable Subject Matter***

**Claims 2, 16, 17, 24 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

**Claims 3-6 are allowed.**

The following is a statement of reasons for the indication of allowable subject matter: The prior art cited on attached form PTO-892 is the most relevant prior art known, however, the invention of these claims distinguishes over the prior art of record because none of the references either alone or in combination disclose or render obvious what is defined in these claims.

Regarding claim 2, the prior art of record fails to teach or fairly suggest a production method of an expanded core fiber comprising a mode expansion monomode fiber joined with a graded index multimode fiber, wherein the mode expansion monomode fiber comprises at least one segment of silica fiber along with at least a second segment of graded index multimode fiber. The Thual et al. reference teaches a mode expansion fiber joined with a graded index fiber, but the mode expansion fiber does not have a second segment of graded index fiber. None of the references listed in



the prior art section teach or suggest using two separate segments of graded index fiber along with a segment of silica fiber.

Regarding claims 16 and 17, the prior art of record fails to teach or fairly suggest a fiber collimator comprising a mode expansion fiber along with a graded index multimode fiber, wherein the mode expansion fiber comprises at least one segment of silica fiber along with at least a second segment of graded index multimode fiber. The Thual et al. reference teaches a mode expansion fiber joined with a graded index fiber, but the mode expansion fiber does not have a second segment of graded index fiber. None of the references listed in the prior art section teach or suggest using two separate segments of graded index fiber along with a segment of silica fiber. Claim 17 depends from claim 16.

Regarding claims 24 and 25, the prior art of record fails to teach or fairly suggest an expanded mode monomode optical fiber with a mode expansion section joined with a graded index fiber segment, wherein the mode expansion fiber comprises at least one segment of silica fiber along with at least a second segment of graded index multimode fiber. The Thual et al. reference teaches a mode expansion fiber joined with a graded index fiber, but the mode expansion fiber does not have a second segment of graded index fiber. None of the references listed in the prior art section teach or suggest using two separate segments of graded index fiber along with a segment of silica fiber. Claim 25 depends from claim 24.

Regarding claim 3, the prior art of record fails to teach or fairly suggest a production method of an expanded core fiber comprising the steps of joining a graded

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index fiber with a silica fiber, splitting the silica fiber, joining a second graded index fiber, splitting the second graded index fiber, joining a second silica fiber, splitting the second silica fiber, and joining the resultant fiber to a monomode fiber. The Thual et al. reference teaches a mode expansion fiber comprising a monomode fiber and a silica fiber joined with a graded index fiber, but the mode expansion fiber does not have a second segment of graded index fiber or a second segment of silica fiber. None of the references listed in the prior art section teach or suggest using two separate segments of graded index fiber along with two segments of silica fiber. Claims 4-6 depend from claim 3.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris H. Chu whose telephone number is 571-272-8655. The examiner can normally be reached on 8:30 AM - 5:00 PM Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.



Chris H. Chu  
Patent Examiner  
December 27, 2005



MICHELLE CONNELLY-CUSHWA  
PRIMARY EXAMINER  
1/6/05